

## Summer disappearance of territoriality in the satyrine butterfly *Lethe sicelis*

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**Abstract** *Lethe sicelis* displays territorial behaviour related to mating. Territorial behaviour was observed in June and September, but not in July and August, although *L. sicelis* was observed. It is suggested that high air temperatures prevent *L. sicelis* from holding territory in summer.

**Key words** Air temperature, *Lethe sicelis*, seasonal change, territorial behaviour.

### Introduction

The behaviours of butterflies often change seasonally with changing air temperature (Hidaka, 1975; Ide, 2000a), since butterflies are ectotherms. The males of many butterfly species hold territories for mating (Shreeve, 1992) and territorial behaviour also changes seasonally, both in time (Bitzer & Shaw, 1995; Fric & Konvička, 2000) and place (Shreeve, 1987). The satyrine butterfly *Lethe diana* (Butler) shows dramatic changes in mate-locating behaviour with season; males of *L. diana* display territorial behaviour in May–June and September–October, but not in July–August (Ide, in press).

*Lethe sicelis* (Hewitson), a congener with *L. diana*, also displays territorial behaviour (Fukuda *et al.*, 1984). However, no seasonal change in the territoriality of *L. sicelis* has been reported to date. In this study, I recorded the territorial behaviour of *L. sicelis* observed for three years, and here describe seasonal changes in its territoriality.

### Materials and methods

In the *L. sicelis* flight season from 1998 to 2000, transect censuses were carried out on almost every sunny day (66, 85, and 97 days in 1998, 1999, 2000, respectively). A fixed route of approximately 3 km was established in the Kamigamo Experimental Forest Station, Graduate School of Agriculture, Kyoto University, in the north of Kyoto City, Japan (135°46'E, 35°04' N; 140 m in altitude); this was the same route as reported in Ide (2000b). I walked along the route and counted *L. sicelis* seen within an estimated distance of 5 m ahead, above, or on either side of me, in accordance with the method of Ishii (1993). When a butterfly was found holding a territory, it was recorded.

### Results and discussion

*L. sicelis* was observed at the station from June to September every year. Territorial behaviour was observed, mostly around sunlit branch tips that faced open spaces, in June and September, but it was scarcely observed in July and August (Fig. 1). The mean air temperatures on the days when territorial behaviour was observed never exceeded 25.5°C. One territorial male was observed in August, but it was on a cloudy day and the mean air

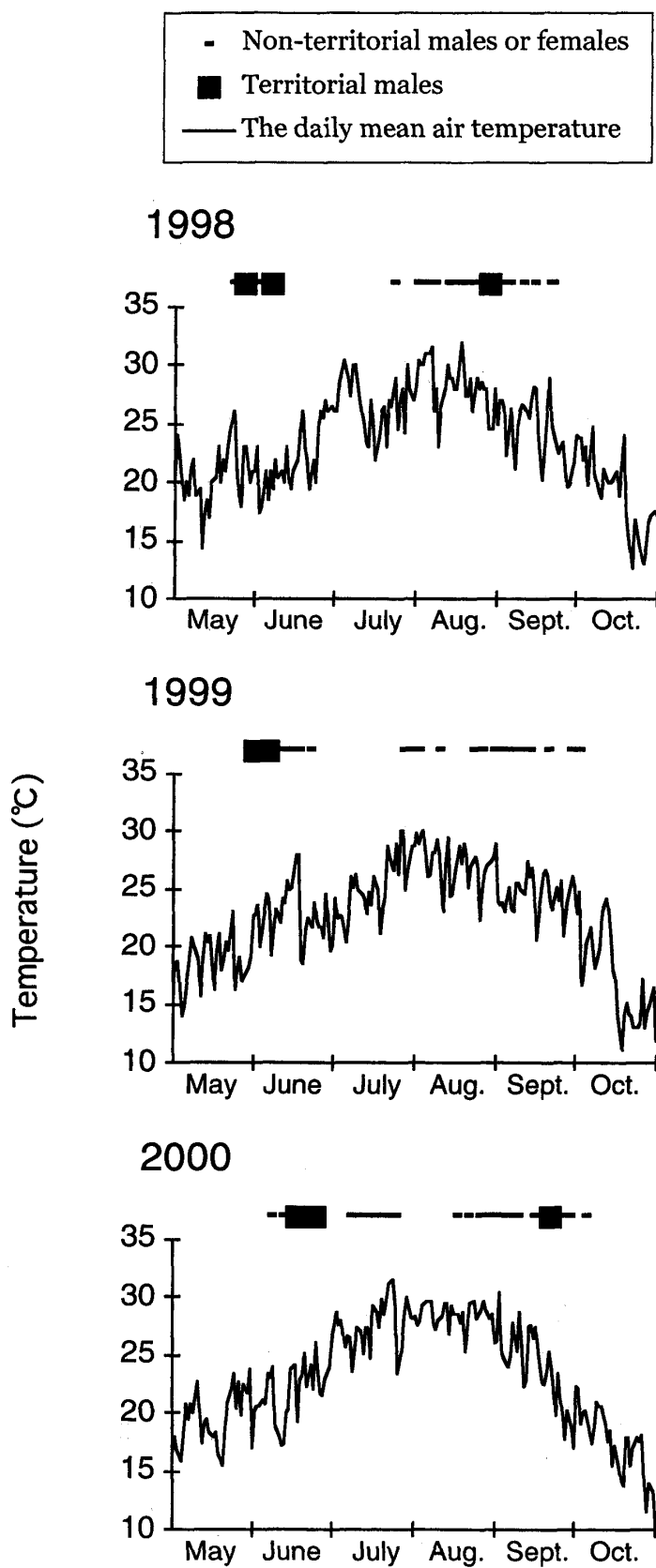


Fig. 1. Seasonal change in territoriality in *Lethe sicelis*. Territorial behaviour was observed in June and September, but was not observed in July or August, although *L. sicelis* was observed.

temperature was low.

The disappearance of territorial behaviour in summer has also been reported in *L. diana* (Ide, in press). A male *L. diana* displays territorial behaviour only when his body temperature is maintained within a suitable range. In summer, the thermal environment of the territory is too hot, and *L. diana* cannot display territorial behaviour (Ide, unpublished). *L. sicelis* also did not display territorial behaviour when it was hot, which suggests that high temperatures prevent *L. sicelis* from displaying territorial behaviour. The mate-locating behaviour of male *L. sicelis* in July and August, when they do not hold territories, is not known. Further research is necessary to clarify the mate-locating behaviour of *L. sicelis* during all seasons.

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### 摘 要

ヒカゲチョウのなわばり行動の季節変化 (井出純哉)

ヒカゲチョウ (ジャノメチョウ亜科) の雄は配偶行動としてなわばり行動を行う。3年間の調査の結果、本種の成虫は6月から9月まで出現し6月と9月にはなわばり行動が見られるが、7–8月には見られないことがわかった。同属のクロヒカゲと同様、暑い時期には体温が上がり過ぎないように、なわばり行動をやめている可能性がある。

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